A Report on the PhD Symposium at ISEC 2021

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ABSTRACT

The annual ACM Innovations in Software Engineering Conference (ISEC) held its 14th edition online during 25–27th February, 2021. Since 2019, the conference has included a PhD symposium. The aim of the symposium is to offer PhD scholars in early stages of their research work a platform to present their work and also to get feedback from the audience. This report from the symposium co-chairs briefly summarises the effort involved in organising the symposium and a brief summary of the papers presented at the symposium.

CCS CONCEPTS

• **Software and its engineering**;

KEYWORDS

Software Engineering

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1 INTRODUCTION

Research in Software Engineering is now at a crossroads. It continues to garner increased attention from the industry and practice, while new avenues that combine theory, algorithms, architectures and artificial intelligence are constantly being explored in academia.

The Innovations in Software Engineering Conference (ISEC) series, now in its 14th year, has been the platform for the software engineering community, particularly in India, to meet and share recent advances in software engineering. Since 2019, ISEC has included a Doctoral Symposium as part of its programme. The symposium is an opportunity for PhD students to present their work to a friendly audience for critical feedback. It is also a venue for these students to network with the researchers in their field.

The rest of this report describes the process for announcing and reviewing submissions and provides the abstracts of selected symposium papers. The papers themselves are not included in the formal proceedings of ISEC.

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2 ANNOUNCEMENT, SUBMISSIONS AND REVIEWS

The call for submissions for ISEC PhD symposium was formally made on the conference website in September 2020 and circulated via email. Submissions were due by Nov 15th, 2020. The submissions were reviewed by a Programme Committee consisting, additionally, of the following members:

(1) Swaminathan Natarajan, TCS
(2) Soumyadip Bandopadhyay, BITS Goa
(3) Meenakshi D'Souza, IIIT Bangalore
(4) Rajeeb Mall, IIT Kharagpur
(5) Durgaprasad Mohapatra, NIT Rourkela
(6) Giri Prabhakar, Siemens

Submissions were required to be single author (the PhD student). A total of three submissions were made of which the reviewers selected two for online presentation.

3 ABSTRACTS OF ACCEPTED PAPERS

(1) **UML-Based Test Cases Selection and Prioritisation in Regression Testing**. Author: Kunxiang Jin, King's College London.
Abstract: Testing is the most critical process in the software development life cycle and typically costs more than 50% of development time. Model-Based Testing (MBT) is a testing method which uses software specification or design models as the basis of performing testing, and allows the testing process to start earlier in the development process. Nowadays, more and more software is managed under an agile methodology, which means the requirements and design models will progress or change frequently in a short period. Regression testing is intended to ensure that the software improvements do not affect existing features or bring any new fault. Re-execution of the whole previous test suite will lead to an increase in the test budgets and may not detect newly-introduced errors in most circumstances. Therefore, it is critical to decide how to select the subset of existing testcases and generate new necessary test cases. The balance between software quality and development time is a vital factor within software companies. Test cases prioritisation methods improve the effectiveness of regression testing by ordering some test cases, which are expected to outperform others in detecting software failures, earlier in the testing phase. Thus, model-based test case selection and prioritisation in regression testing is an important research topic.

(2) **Knowledge Driven Synthesis Using Resource-Capability Specifications for Control Software Design**. Author: Amar Banerjee, TCS Innovation Labs and IIIT Hyderabad.
Abstract: One of the biggest engineering challenges posed by Industrie 4.0 is to enable fast, reliable, and flexible integration of multiple heterogeneous hardware and software components. A plant system's components have specific behavior and offer specific capabilities integrated into a controller design to fulfil the stakeholder objectives. Here, the design challenge is identifying the right components and integrating them in a specific pattern to achieve plant goals. Manual design approaches would not be scalable based on the complexity and number of components in large systems. We propose a knowledge-driven approach to capture resource-capability knowledge and use it to synthesize a controller design for a plant goal. We use a component-capability specification concept to abstract the component's usage model stored as knowledge and enables reasoning about capability satisfaction.

4 CONCLUSION

The 2021 ISEC PhD symposium provided an opportunity for PhD students to present their work. We hope that future ISEC will continue to encourage greater participation at the PhD symposia.

We wish to thank Durga Prasad Mohapatra and Samaresh Mishra, ISEC 2021 General Chairs for their encouragement and help in organizing the PhD symposium.